DECLARATION OF PERFORMANCE

DoP No. 17/0345-WTB1

1. Unique identification code of the product-type: **Walraven Throughbolt Option 1 WTB1**

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11 (4):

   See: **ETA-17/0345**
   Charge number: **See product packaging**

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:

Generic type	Torque-controlled expansion anchors
For use in	cracked and non-cracked concrete C20/25 to C50/60 acc. To EN 206:2000-12
Material	WTB1 Throughbolts are torque-controlled expansion anchors in sizes of M8, M10, M12, M16 and M20 made of galvanized carbon steel.
Use category	Torque-controlled steel expansion anchors in sizes M8, M10, M12, M16 and M20 for use in cracked and non-cracked concrete.
Loading	static or quasi-static

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

   J. van Walraven Holding B.V., Industrieweg 5, 3641 RK Mijdrecht, The Netherlands

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:

   System 1

7. In case of the declaration of performance concerning a construction product covered by a harmonized standard:

8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

Technical Assessment Body:	**Technical and Test Institute for Construction Prague**
European Technical Approval:	**ETA-17/0345 edition of 2017-04-12**
European Assessment Document:	**EAD 330232-00-0601**
Notified body/ies:	**1488**

The notified body 1488 performed under system 1:
(i) determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product;
(ii) initial inspection of the manufacturing plant and of factory production control;
(iii) continuous surveillance, assessment and evaluation of factory production control and issued:

Certificate of constancy of performance: 1488-CPR-0292/W

9. Declared performance/s:

Essential Characteristics	Performance	Harmonized Technical Specification
Characteristic resistance for tension and shear load	ETAs-17/0345, Annex C	EAD 330232-00-0601
Edge distances and spacing	ETAs-17/0345, Annex C	
Characteristic resistance under fire exposure	ETAs-17/0345, Annex C	

Table: Characteristic values of anchors subject to tensile load without the influence of distances between anchors and from the edge of concrete

				M8		M10		M12		M16		M20	
				Red(1)	Std	Red(1)	Std	Red	Std	Red	Std	Red	Std
Steel failure													
Characteristic resistance	$N_{Rk,s}$		[kN]	15,8		25,2		37,3		66,1		101	
Partial safety factor	γ_{Ms}			1,4									
Concrete pull-out failure													
Characteristic resistance in cracked concrete	$N_{Rk,p}$		[kN]	3,0	5,0	6,0	9,0	9,0	12,0	16,0	20,0	-	30
Calculated resistance in uncracked concrete	$N_{Rk,p}$		[kN]	7,5	90	9,0	12,0	12,0	20,0	-	35,0	-	-
Installation safety factor	γ_{2}2)= γ_{inst}3)4)		[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Increasing factor													
Cracked and uncracked concrete	ψ_c	C30/37	[-]	1,20	1,12	1,16	1,22	1,22	1,0	1,11	1,14	1,12	1,07
	ψ_c	C40/50	[-]	1,40	1,22	1,33	1,44	1,44	1,0	1,22	1,28	1,26	1,14
	ψ_c	C50/60	[-]	1,60	1,33	1,50	1,67	1,67	1,0	1,33	1,43	1,39	1,21

Concrete cone failure													
Characteristic resistance in cracked concrete	$N_{Rk,c}$	C20/25	[kN]	-	-	-	-	-	-	-	-	25,8	-
Factor for cracked concrete	$k_{ucr,N4)}$		[-]	7,2									
	$k_{ucr,N4)}$		[-]	7,7									
Characteristic resistance in non-cracked concrete	$N_{Rk,c}$	C20/25	[kN]	-	-	-	-	-	-	26,4	-	36,1	49,6
Factor for uncracked concrete	$k_{ucr,N4)}$		[-]	10,1									
	$k_{ucr,N4)}$		[-]	11,0									
Installation safety factor	$\gamma_{22)} = \gamma_{inst3)4)}$		[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Effective anchorage depth	h_{ef}		[mm]	32	47	39	59	48	68	65	85	80	99
Spacing	$S_{cr,N}$		[mm]	96	141	117	177	144	204	195	255	240	297
Edge distance	$C_{cr,N}$		[mm]	48	71	59	89	72	102	98	128	120	149

k12)=kucr
k12)=kucr

Splitting failure											
Spacing	$S_{cr,sp}$	[mm]	170	220	200	300	250	340	320	430	410	530
Edge distance	$C_{cr,sp}$	[mm]	85	110	100	150	125	170	160	215	205	265
Installation safety factor	$\gamma_{22)} = \gamma_{inst3)4)}$	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0

(1) Use restricted to anchoring statically indeterminate structural components
(2) parameter for design according to EOTA ETAG 001 Annex C
(3) parameter for design according to CEN/TS 1992-4-4:2009
(4) parameter for design according to FprEN 1992-4:2 016

Table B2: Installation parameters – Minimum spacing and edge distance

			M8		M10		M12		M16		M20	
			Red(1)	Std	Red(1)	Std	Red	Std	Red	Std	Red	Std
Minimum thickness of concrete member	h_{min}	[mm]	100	100	100	120	100	140	130	170	160	200
Minimum spacing and edge distance in cracked concrete												
Minimum spacing	S_{min}	[mm]	55	50	75	70	150	90	190	160	300	180
Minimum spacing for edge distance	$C \geq$	[mm]	45	50	60	65	100	80	125	130	200	150
Minimum edge distance	C_{min}	[mm]	40	40	50	45	80	65	110	90	120	100
Minimum edge distance for spacing	$S \geq$	[mm]	80	80	100	100	180	150	280	240	260	220

Minimum spacing and edge distance in uncracked concrete											
Minimum spacing	S_{min} [mm]	55	50	75	70	150	90	190	160	300	180
Minimum for edge distance	$C \geq$ [mm]	45	50	60	65	100	80	125	130	200	150
Minimum edge distance	C_{min} [mm]	45	40	60	50	100	65	125	100	200	120
Minimum edge distance for spacing	$S \geq$ [mm]	55	100	75	110	150	180	190	240	300	225

1) Use restricted to anchoring statically indeterminate structural components

Table C3: Characteristic resistance under shear load

		M8		M10		M12		M16		M20	
		Red(1)	Std	Red(1)	Std	Red	Std	Red	Std	Red	Std
Characteristic resistance	$V_{0Rk,s}$ [kN]	10		16		23		43		67	
Ductility factor	k_7 [-]	0,8		0,8		0,8		0,8		0,8	
Partial safety factor	γ_{Ms} [-]	1,25		1,25		1,25		1,25		1,25	
Steel failure with lever arm											
Characteristic resistance	$M_{0Rk,s}$ [kN]	19		38		67		167		328	
Partial safety factor	γ_{Ms} [-]	1,25		1,25		1,25		1,25		1,25	
Concrete pry-out failure											
Characteristic resistance concrete C20/25	$V_{Rk,cp}$ [kN]	-	-	-	-	-	-	-	-	-	-
Factor	k_8 [-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Installation safety factor	$\gamma_{22)} = \gamma_{inst3)4)}$ [-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Concrete edge failure											
Effective length of anchor	ℓf [mm]	32	47	39	59	48	68	65	85	80	99
Anchor diameter	d_{nom} [mm]	8		10		12		16		20	
Installation safety factor	$\gamma_{22)} = \gamma_{inst3)4)}$ [-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0

(1) Use restricted to anchoring statically indeterminate structural components
(2) parameter for design according to EOTA ETAG 001 Annex C
(3) parameter for design according to CEN/TS 1992-4-4:2009
(4) parameter for design according to FprEN 1992-4:2 016

1) Use restricted to anchoring statically indeterminate structural components

Table C5: Characteristic values of resistance to tension load under fire exposure[1)]

			M8		M10		M12		M16		M20	
			Red(2)	Std	Red(2)	Std	Red	Std	Red	Std	Red	Std
Characteristic fire resistance duration at 30 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,4		0,9		1,7		3,1		4,9	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 60 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,3		0,8		1,3		2,4		3,7	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	–
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 90 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,3		0,6		1,1		2,0		3,2	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	1,0	2,7	1,7	4,8	2,9	6,9	6,1	12,0	10,3	17,6
Characteristic fire resistance duration at 120 minutes												
Steel failure	$N_{Rk,s,fi}$	[kN]	0,2		0,5		0,8		1,6		2,5	
Pull-out failure	$N_{Rk,p,fi}$	[kN]	0,6	1,0	1,2	1,8	1,8	2,4	3,2	4,0	-	-
Concrete cone failure	$N_{Rk,c,fi}$	[kN]	0,8	2,2	1,4	3,9	2,3	5,5	4,9	9,6	8,2	14,0
Spacing	$S_{cr,N}$	[mm]	$4xh_{ef}$									
	S_{min}	[mm]	55	50	75	70	150	90	190	160	300	180
Edge distance	$C_{cr,N}$	[mm]	$2xh_{ef}$									
	C_{min}	[mm]	c_{min} = 2 x h_{ef} however if the fire attack is from more than one side, the edge distance of the anchor has to be ≥ 300 mm and ≥ 2 x h_{ef}									

(1) In absence of other national regulations the partial safety factor for resistance under fire exposure. γM,fi = 1,0 is recommended

(2) Use restricted to anchoring statically indeterminate structural components

Table C6: Characteristic values of resistance to tension load under fire exposure

			M8		M10		M12		M16		M20	
			Red(2)	Std	Red(2)	Std	Red	Std	Red	Std	Red	Std
Characteristic fire resistance duration at 30 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	4		9		17		31		49	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	4		11		26		67		130	
Characteristic fire resistance duration at 60 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	3		8		13		24		37	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	3		10		20		50		97	
Characteristic fire resistance duration at 90 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	3		6		11		20		32	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	3		7		17		43		84	
Characteristic fire resistance duration at 120 minutes												
Steel failure without lever arm	$V_{Rk,s,fi}$	[kN]	2		50,5		8		16		25	
Steel failure with lever arm	$M_{Rk,s,fi}$	[Nm]	0,6		6		13		33		65	
Concrete pry-out failure												
Factor2)	k_8	[-]	15	10	15	10	10	20	20	20	20	20
Concrete edge failure			The characteristic resistance V0 in concrete C20/25 to C50/60 is determined by: Rk,c,fi V0 0 Rk,c,fi = 0,25 x V Rk,c(≤90) and V0 0 Rk,c,fi = 0,20 x V Rk,c(≤120) with the initial value of the characteristic resistance V0 in cracked concrete Rk,c C20/25 under normal temperature									

(1) Use restricted to anchoring statically indeterminate structural components
(2) The values of factor k8 and relevant values of NRk,c,fi given in the Table C5 have to be considered in the design

Technical Documentation and / or Specific Technical Documentation:

ETA-17/0345 edition of 2017-04-12

10. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by: